>BUSINESS MADE **SIMPLE**

Introduction of 3G technologies in 2G bands
The example of UMTS 900

Jesús de Viguri
Wireless Development Director, EMEA
Algiers, 22nd. June 2006

NORTEL

Agenda

- The path to UMTS
- UMTS deployment challenges
- Advantages of UMTS900
- Standards & regulation readiness
- Nortel's involvement and view

The path to UMTS

> Wireless technology history is short but remarkable.
- 1G basic mobile voice based on analog systems and national service (e.g. AMPS)
- 2G digital and international systems based on CDMA or TDMA (e.g GSM) in the 1990's.
- By 1995 mobile systems had grown rapidly, and user were demanding wireless data services giving rise to third generation (3G) systems such as UMTS.

> UMTS allows the introduction of new services,
- video telephony that allows video communication using the mobile
- high-speed data services, e.g. already deployed HSDPA at 3.6 Mbps

> At WARC-92 (World Association Radio Conference, 170 Mhz of spectrum were reserved for IMT 2000 terrestrial components in the range of 1885 to 2220 Mhz

UMTS deployment challenges

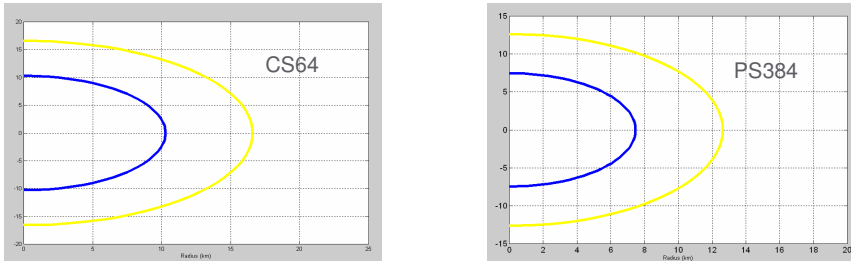
> UMTS deployment is slower than desired
- UMTS is an overlay network
  - Most of Operator's revenue is still on GSM business
- UMTS coverage is significantly inferior than GSM network coverage

> What are the main factors for this?
- Deployment cost
  - The spectrum allocated for UMTS implies greater number of BTS's needed for covering the same area and to avoid propagation issues (indoor solutions)
- Site acquisition problem

> As user moves from GSM to UMTS, spectrum in the band of 900Mhz will become available

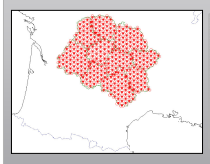
Advantages of UMTS900

- The difference of radiowave propagation pathloss between 900 MHz and 2 GHz in the same environment can be more than 11 dB
- For offering the same service (data rate), the cell range of UMTS900 in rural area is about two times of that of UMTS2000

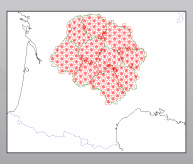


5 Nortel Confidential Information

Advantages of UMTS900



- Up to 60% site count reduction
- Up to 25% in-building penetration gain
- **GSM 900 site reuse**



Case study: rural area of 64 000 km²

Service	2 Ghz	900 Mhz	Site Number Reduction (%)
CS64	224	90	60
PS384	468	181	61

6 Nortel Confidential Information

Advantages of UMTS900

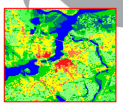
> Reuse of existing GSM sites will reduce tremendously the cost of UMTS900 deployment

- Reuse of the existing sites
- Reuse of the existing antenna systems and feeders
- Adding new BS cabinet or replacing the existing GSM BTS by a multi-mode GSM+UMTS Base Station

7 Nortel Confidential Information

Deployment strategies

> UMTS900 with HSDPA/HSUPA to be deployed in rural area by reusing the existing GSM sites to offering voice and high speed mobile internet service



> UMTS900 with HSDPA/HSUPA to be deployed in sub-urban and small cities by reusing the existing GSM sites to offering voice and high speed mobile internet service with good indoor coverage quality

> UMTS900 with HSDPA/HSUPA to be deployed in big cities for offering voice and high speed mobile internet service with good deep indoor coverage

8 Nortel Confidential Information

Standards & regulation readiness

> Proposal of Orange at Ran Plenary #26 in December 04
  - 11 companies confirmed as supporting:
    - Orange, Nortel, Alcatel, SFR, Lucent, Telefonica, BouyguesTelecom, O2, Qualcomm Europe, Nokia, Sagem

> UMTS900 work item was approved by 3GPP RAN plenary in December 2004.

> Work item completed end November 2005 and specs available

> UMTS900 (band VIII) included in the release 3 European harmonised standards EN301908-xx series by ETSI/TFES
  - Final draft version of European harmonised standards Release 3 finalized in 2006-02.
  - They should be published before end of 2006 after approval and public consultation process.

> ECC-PT1 sharing studies on going for UMTS operating in 900 MHz and 1800 MHz bands

> A new ECC decision on UMTS900 and UMTS1800 band plan and channel arrangement is planned to be finished by September 2006

Nortel's strong involvement in UMTS 900

> Nortel has been driving UMTS 900Mhz standardization
  - 3GPP: studies from Dec04 to Dec 05
    - Nortel is the 3GPP Technical prime
  - European Regulatory: CEPT/ECC's decision expected in Sep 06
  - National spectrum re-distribution expected in 2007

> Nortel – Qualcomm co-development
  - UMTS & HSDPA 900 Mhz (cat6 @ 3.6Mbps) demonstration during 3GSMWC 2006

> Advanced Engineering studies for leading Wireless Operators

> Time to Market UMTS 900Mhz solution

> Leading GSM Spectral Efficiency feature
  - Enabling freeing up Spectrum for UMTS 900 deployment

>Live UMTS/HSDPA 3.6 Mbit/s at 900 MHz

>Nortel Driver of UMTS 900 MHz Specifications at 3GPP
completed in December 2005

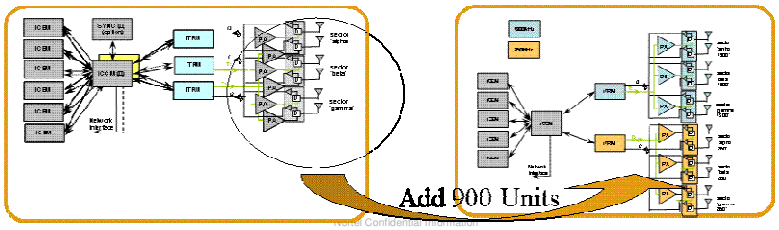
Nortel Product Strategy

> Nortel UMTS 900 products will inherit all existing UMTS functionality including HSDPA and HSUPA

> Node B :
- Digital rack common with 2100 Mhz
- New RF modules
- Dual band support without forklift

> RNC can support 900 and 2100 BTS simultaneously

> Mobility & RRM are applied in the same way than in UMTS



Nortel View

> Optimum solution for Rural Rollout due to improved coverage. Will Significantly reduce number of Rural coverage sites

> Capex savings up to 40% on Access investment thanks to reduction of Node B units

> A good solution when 2G and 3G networks will merge
- Good indoor coverage in Urban areas

> Nortel Aggressive Lead time for 900Mhz:
- Leverage US GSM/UMTS 1900 and 850 development
- 900MHz prototype RF components exist today for UMTS Node B
- Terminal Manufacturers available 2007